

Effects of CO/CO₂ ratio in synthesis gas on coke formation of K/Fe-Cu-Al Fischer-Tropsch catalyst

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The coke formation has been investigated with varying CO/CO₂ ratio in feed gas on a K/Fe-Cu-Al catalyst during Fischer-Tropsch (FT) synthesis. The K/Fe-Cu-Al catalyst was prepared by the co-precipitation of Fe-Cu-Al precursors, followed by potassium impregnation. The FT reactions using balanced feed gas with various CO/CO₂ ratios were performed in a fixed bed reactor. The CO_x conversion to hydrocarbons decreased with the CO/CO₂ ratio in feed gas. X-ray photoelectron spectroscopy and X-ray diffraction results showed that high CO/CO₂ ratio favored the formation of iron carbides. Overall, low CO/CO₂ ratio in feed gas was effective to inhibit the coke formation.